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Economic Perspective 3

THE EXPERIENCE OF SCOTTISH FIRMS IN THE NORTH SEA OIL SUPPLY INDUSTRY: A GUIDE TO THE FUTURE?*

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The development of the North Sea offshore oil industry in the 1970s and 1980s provided Scottish firms with opportunities on their doorstep. Since the industry's primary location onshore was in Aberdeen, an even greater opportunity was created for existing and new local firms in the North East.

The extent to which they were able to capitalise on that opportunity is of more than historical importance. It provides some clues to the future of the industry. The downturn in oil business has already led many firms to look for new markets abroad. It has led others to go out of business. The success of Scottish and local firms in the North East to enter the oil industry supply markets can tell us a great deal about their ability to compete in locations of new oil development. Where entry has been successful and easy, the industry is competitive with little advantage to existing firms. This means that Scottish firms who now supply the North Sea markets will have little advantage over new local entrants in other foreign markets and may find it difficult to export. On the other hand where entry was difficult and rare, Scottish firms which did manage to penetrate the market may have incumbent advantages in future markets.

The extent of participation

In a survey of North Sea offshore oil supply firms in the summer of 1984 we looked at the question of which factors

inhibited entry and expansion in the various activities which make up the offshore oil supply industry.

The survey of firms wholly engaged in oil related activity revealed that, at least superficially, local Scottish penetration had been substantial. Thirty five percent of firms in our sample were local, 39% were Scottish and 64% had a UK parent company. Of course, entry was not uniform across types of activity. Table 1 shows that local and Scottish firms were not represented in all categories. Although they were not clearly concentrated in one or two activity types, they do seem to be more engaged in the less obviously oil specific activities. For example no fewer than 20% reported banking and finance as their main activity.

Entry deterrence

The question of what distinguishes activities and which of their characteristics determine the degree of penetration is more difficult to answer. The first problem is to decide on a measure of entry rate. The next problem is to relate chosen characteristics of the activities to that rate.

In an earlier paper we chose four proxy measures of the entry rate and related certain characteristics to differences in entry rate across activities. The characteristics were chosen to reflect

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Table 1 Percentage of firms by main activity owned by local, Scottish, UK and North American firms

	Local	Scottish (excl. local)	U K (excl. Scottish)	North American	Other	Number in sample
Direct oil production related*	14	7	14	36	32	28 (15%)
Mechanical engineering	50	6	6	38	0	16 (9%)
Chemicals	100	0	0	0	0	1 (-)
Miscellaneous 'Metal Goods'	0	100	0	0	0	1 (-)
Miscellaneous machinery products	33	0	33	0	33	3 (2%)
Electrical and electrical maintenance engineering	50	0	25	25	0	8 (4%)
Miscellaneous manufacturing	50	0	0	0	50	2 (1%)
Construction	27	0	53	7	13	15 (8%)
Distribution and supplies	24	2	20	39	15	46 (25%)
Retail distribution	33	33	33	0	0	3 (2%)
Catering	0	0	0	100	0	1 (-)
Transport	41	0	29	13	18	17 (9%)
Renting and hiring	17	0	17	50	17	6 (3%)
Banking and finance	51	5	38	3	3	37 (20%)
Other services	67	0	33	0	0	3 (2%)
Number	64(35%)	8(4%)	46(25%)	44(23%)	25(13%)	187

*includes general exploitation, diving, drilling, oil production, surveying, well stimulation.

theoretical considerations of what is meant by a barrier to entry and included economies of scale, research and development, and absolute cost advantages. (1)

We found that established firms in the industry do have certain cost advantages which may deter new or diversifying firms from entry into the market. These advantages take the form of information and technological access which take time to acquire. It was suggested that the timescale of activity was such as to preclude effective competition in some activities.

For each activity the firm was asked particularly about seven characteristics: the percentage minimum market share at which the firm would be prepared to sustain an activity (MINSHARE) - used as a measure of potential economies of scale; the degree of access to technology for a newcomer to the oil industry (ACTEC); the time in months for a new entrant to offer competition (TCOMP); their ownership of relevant patents (PATOWN); whether they regarded the offshore oil supply industry as more risky than other industries (RISK); whether there was a shortage (at existing wages) of any particular types of labour such that expansion would be inhibited, and if there was, the percentage of their total labour force made up by such groups (PERTOT). In addition, each firm was asked how many of its employees (or employees of the group of companies of which it was a part) were engaged in research and development. Total employment in the Aberdeen area and such employment as a percentage of the group's employment furnished an estimate of group workforce, and thus the percentage of the group's employment involved in research and development could be calculated (GRPRD).

Local firms

The mean responses of local firms were compared with those of non-local firms in order to investigate whether they face significantly different barriers to entry. Firms were classified as being local or non-local. To be local a firm must be either (a) a subsidiary or a branch with

its parent located in the Aberdeen area and all major investment decisions are taken locally, or (b) neither a subsidiary nor a branch and all major investment decisions are taken locally.

Table 2 Local and non-local firms compared

	Non-local firms	Local firms	Significance (1)
Difficulty of access to technology (ACTEC)(2)	2.57	2.55	0.920
Ownership of patents (PATOWN)(3)	0.602	0.472	0.081*
Research and development (%) (GRPRD)	6.05	11.27	0.191
Riskiness (RISK)(4)	0.590	0.589	0.988
Scarce labour (%) (PERTOT)	15.53	26.1	0.038*
Minimum market share (%) (MINSHARE)	2.84	2.12	0.587
Months to competition (TCOMP)	36.08	34.47	0.796
Number of firms in activity (NOFIRMS)	9.39	10.13	0.621

Notes

1. Two-tail test.
2. Range from 1 easy to 5 very difficult.
3. 1 Yes 0 No
4. 1 more risky 0 not
- *. Significance at 10% level

Table 2 shows these mean responses. Generally the replies of local firms are found to be very similar to those of the non-local. The only differences which are statistically significant are for the ownership of patents and the percentage of 'scarce' labour in the workforce. Ownership of patents was significantly lower among local firms and the percentage of their labour force deemed scarce was higher. Thus there is some evidence that

local firms face higher barriers. However, the evidence is quite limited in that responses to the other questions suggest that there is no difference in respect to access to technology, number of competitors, time to competition, critical value of North Sea market share and perceived riskiness. Indeed many of the responses are strikingly similar. The only other difference in means that even approaches significance is that for involvement in research and development, where local firms have a lower proportion of their group's labour force involved in research and development.

Scottish firms

Table 3 Scottish and non-Scottish firms compared

	Scottish firms	Non-Scottish firms	Significance(1)
Difficulty of access to technology (ACTEC)	2.55	2.68	0.369
Ownership of patents (PATOWN)	0.589	0.573	0.780
Research and development (%) (GRPD)	4.25	9.36	0.037**
Riskiness (RISK)	0.607	0.577	0.585
Scarce labour (%) (PERIOD)	17.62	17.11	0.874
Minimum market share (%) (MINSHARE)	2.34	3.01	0.524
Months to competition (TCOMP)	28.5	41.5	0.055*
Number of firms in activity (NOFIRMS)	9.54	9.50	0.978

Notes

(1) Two-tail test.

** Significant at 5% level

Table 3 compares Scottish with non-Scottish firms. Firms were deemed Scottish unless they had a parent company

located outside of Scotland. Two variables generate statistically significant results GRPD and TCOMP. The Scottish firms sampled report lower R & D involvement than other firms and tend to engage in activities with shorter lead times. Table 3 suggests that ownership of patents, percentage scarce labour and number of firms in an activity are very similar for Scottish and non-Scottish firms.

UK firms

The comparison of responses of UK and non-UK firms is presented in Table 4. All firms were classified as being UK firms unless they had a parent located outside of the UK.

Table 4 UK and non-UK firms compared

	UK firms	Non-UK firms	Significance (1)
Difficulty of access to technology (ACTEC)	2.55	2.77	0.154
Ownership of patents (PATOWN)	0.537	0.670	0.025**
Research and development (%) (GRPD)	7.17	6.18	0.687
Riskiness (RISK)	0.610	0.548	0.291
Scarce labour (%) (PERIOD)	19.10	13.54	0.107
Minimum market share (%) (MINSHARE)	1.94	4.36	0.067*
Months to competition (TCOMP)	29.59	49.80	0.040**
Number of firms in activity (NOFIRMS)	10.14	8.27	0.139

Notes

1. Two-tail test.

*. Significant at 10% level

** Significant at 5% level

Overall the mean responses appear quite dissimilar although the differences are only statistically significant in three cases: PATOWN, MINSHARE and TCOMP. The average UK firm is less likely to own any patents, is engaged in activities with shorter times to competition and reports lower critical market shares than the average for non-UK firms. Although not a statistically significant difference UK firms are engaged in activities where the access to technology is easier and the number of firms greater than for non-UK firms. They perceive the business as being riskier, and a higher share of their labour force is scarce.

North American firms

In Table 5 North American firms and non-North American firms are distinguished using the location of the parent company. North American firms tend to engage in activities where access to technology is harder, patent ownership is higher and time to competition is longer. Such activities tend to involve fewer competitors but the firms report lower percentages of scarce labour. This latter result might appear perverse in that activities with these ACTEC, PATOWN and TCOMP characteristics might be expected to involve relatively more scarce labour.

However, the variable PERTOT describes the problems an existing member of the industry would have with respect to recruitment of labour. Thus the result could be interpreted as evidence that North American firms have a relative advantage in the recruitment of labour possibly because of the world-wide extent of their activities.

Overall barrier significance

When Tables 2 to 5 are compared it is evident that it is not generally the same variables which give rise to statistically significant differences. For example GRPRD is only significant in one table and PATOWN is significant in the local/non-local table and in the UK/non-UK table but not in the case of Scottish/non-Scottish

firms. The likely reason for this is that the barriers are specific to particular lines of activity. As we have seen in Table 1, firms from different locations are involved in different activities. We might therefore expect the significance of each type of barrier to vary across locations.

Table 5 North American and non-North American firms compared

	North American firms	Non-North American firms	Signifi- cance (1)
Difficulty of access to technology (ACTEC)	2.971	2.526	0.013**
Ownership of patents (PATOWN)	0.768	0.528	0.000**
Research and development (%) (GRPRD)	7.15	6.85	0.927
Riskiness (RISK)	0.522	0.608	0.194
Scarce labour (%) (PERTOT)	9.52	19.44	0.004**
Minimum market share (%) (MINSHARE)	4.74	2.14	0.122
Months to competition (TCOMP)	61.9	29.1	0.020**
Number of firms in activity (NOFIRMS)	8.00	9.95	0.193

Notes

1 Two-tail test.

** significant at 5% level

Conclusion

Evidence from existing firms in the offshore oil supply industry suggests that there are cost advantages to incumbents in the industry. In a specialised industry

easy access to technology in a reasonable time period is important. The ability of local, Scottish and UK firms to penetrate certain markets has been restricted by their need to acquire both technology and expertise. Furthermore, established firms employ superior factors, including information, and have access to restricted labour skills. This suggests that at least some parts of the industry have been dominated by the established firms who have access to these scarce factors. The newer entrants may have been forced to enter on the periphery of the industry using less technological ways into the market and employing less specialised skills. We do not find strong evidence, however, of any economies of scale in the industry, not that it perceived itself to be relatively risky enough to deter entry. Neither does there seem to be a direct and obvious link between general research and development capability and entry.

While the number of local, Scottish, and UK firms in the industry is higher than is popularly supposed they do face additional barriers which may have directed them along particular pathways to the market. They tend to be in less technological industries, although the evidence here is rather weak. Although local firms may have some advantages in the recruitment of local labour, in general greater access to an international labour market has given established firms an advantage in labour recruitment. This is particularly significant for North American firms.

In general, firms have been deterred from entering the North Sea offshore oil supply industry, although substantial new entry has taken place. It is likely that entry has taken place mainly at the less sophisticated end of the market. However some entry has taken place even where access to knowledge was restricted but could be acquired within a timescale compatible with a reasonable return to investment. In this sense the experience of the industry conforms to the notion of barriers to entry as temporary, often capable of being overcome in the long run, but acting as a constraint on short run entry. In the example of the offshore oil supply industry the long run may be too long for a particular location and the effects of a new international industry on the local long term industrial base may be quite limited. Only in certain, more technological, sectors of the industry

where scarcity of skilled labour and knowledge has been overcome, do UK, Scottish and Aberdeen companies have obvious advantages. Elsewhere it is difficult to envisage the UK providing effective competition at new locations. They will have little incumbent advantage to offset any preferential treatment given to local firms, and will have to work very hard to develop export markets.

Our results therefore suggest that there is some hope that the North Sea experience of UK firms will provide an export base for the future. That base, however, is likely to be rather narrow.

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1. For further details see Cairns, J A, A H Harris and H C Williams "Barrier to Entry in the North Sea Offshore Oil Supply Industry", University of Aberdeen, Department of Economics, North Sea Oil Occasional Paper No. 24, 1987.